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06/26/2008

Katsunori Shimomura

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EXAMINER

KHUU, HIEN DIEU THI

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/571,505	<b>Applicant(s)</b> SHIMOMURA ET AL.	
	<b>Examiner</b> CINDY H.D.T. KHUU	<b>Art Unit</b> 2863	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 12-15, 18, 22/18 and 26/18 is/are rejected.
- 7) ☒ Claim(s) 2-11, 16-17, 19-21, 22-26/19-21 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 March 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>03/10/2006</u> . | 6) <input type="checkbox"/> Other: ____.  |

## **DETAILED ACTION**

### ***Specification Objections***

The abstract of the disclosure is objected to because it exceeds 150 words in length and contains a legal phraseology term “comprises” (lines 2 and 4). See MPEP § 608.01(b).

The specification is objected to because it contains references to claim numbers (example: page 3, line 9).

### ***Claim Objections***

Claims 1-4 and 18-21 are objected to because of the following informality: The limitations follow the “controller means” are unclear. The functionality language for the controller means should be clearer and formatting can be better structured.

Claims 16-17 are objected to because of the following informality: The limitations “under the control of the controller means” fail to provide proper antecedent basis.

Claims 12-14 are objected to because of the following informality: Missing “and” before last paragraph.

Claim 2 is objected to because of the following informality: The limitations “measuring camera position measuring sensors” (lines 10, 15 and 18) would be clearer to say -- camera position measuring sensors --.

Claim 4 is objected to because of the following informality: The limitations “measuring camera position measuring sensors” (lines 12, 18 and 21) would be clearer to say -- camera position measuring sensors --.

Claim 13 is objected to because of the following informality: The limitations “measuring camera position measuring sensors” (line 9) would be clearer to say -- camera position measuring sensors --.

Claim 15 is objected to because of the following informality: The limitations “measuring camera position measuring sensors” (line 11) would be clearer to say -- camera position measuring sensors --.

Claim 19 is objected to because of the following informality: The limitations “measuring camera measuring position sensors” (lines 5 and 14) would be clearer to say -- camera position measuring sensors --.

Claim 21 is objected to because of the following informality: The limitations “measuring camera measuring position sensors” (lines 8-9 and 20) would be clearer to say -- camera position measuring sensors --.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 12 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshimura et al. (US 6,061,126).

With respect to claims 12 and 14, Yoshimura discloses a three-dimensional data acquisition device (20a-f; LDa1-3, LDc1-3, LDD1-3, LDe1-3, LDf1-3; fig. 7) for performing the measurement of the three-dimensional surface shape of an object (1) under the control of a three-dimensional data processing device (22), for generating three-dimensional data (column 3, lines 55-67), comprising:

Art Unit: 2863

at least one or more object position measuring sensors (40, figs. 16-17) each provided at a given position in a space (figs. 16-17), for detecting the position of said object in said space (column 8, lines 28-37);

a plurality of light sources (LDa1-3, LDc1-3, LDd1-3, LDe1-3, LDe1-3, LDf1-3) each provided at a given position in said space, for projecting a stripe pattern onto said object (column 8, lines 62-67);

a plurality of measuring cameras (20a-f) each provided at a given position in said space, for capturing the stripe pattern projected onto said object (column 8, lines 62-67) and for detecting a part or all of the position, inclination, direction of light axis, magnification of the camera in said space (column 8, lines 44-61).

Claim 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Sakamoto et al. (US 2003/0174880).

With respect to claim 12, Sakamoto teaches of a three-dimensional data acquisition device (201-204, fig. 10) for performing the measurement of the three-dimensional surface shape of an object (object 100, fig. 10) under the control of a three-dimensional data processing device (205 and 400, fig. 10) for generating three-dimensional data (abstract, 303 of fig. 9, par.0124), said three-dimensional data acquisition device comprising:

said three-dimensional data acquisition device (201-204, fig. 10) comprising:

a plurality of light sources (201-201, fig. 10) each provided at a given position in a space (fig. 10), for projecting a stripe pattern onto said object (par.0052); and

a plurality of measuring cameras (203-204, fig. 10) each provided at a given position in said space (fig. 10) for capturing the stripe pattern projected onto said object (par.0052, fig. 10) and for detecting a part or all of the position, inclination, direction of light axis, magnification of the camera in said space (par.0052, fig. 10).

Claim 13 is rejected under 35 U.S.C. 102(b) as being anticipated by Fujita et al. (EP 1197729).

With respect to claim 13, Fujita discloses a three-dimensional data acquisition device (figs. 1-2) for performing the measurement of the three-dimensional surface shape of an object (object) under the control of a three-dimensional data processing device (30, fig. 1), for generating three-dimensional data (par.0024 and par.0036), comprising:

a plurality of light sources (11b-f and 14a-f; fig. 2) each provided at a given position in said space (fig. 2), for projecting a stripe pattern onto said object (par.0039 and par.0052);

a plurality of measuring cameras (camera 12 inside measuring head 10 of figs. 1-2; cameras 21 and 22 of fig. 1) each provided at a given position in said space (fig. 1), for capturing the stripe pattern projected onto said object (par.0052); and

at least one or more measuring camera position measuring sensors (16, fig. 10) each provided at a given position in said space (fig. 2), for detecting a part or all of the parameters of the position, inclination, direction of light axis, magnification of said measuring camera in said space (par.0041).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fujita et al. (EP 1197729) in view of Yoshimura et al. (US 6,061,126).

With respect to claim 15, Fujita teaches everything claimed, as rejected in claim 13 above.

However, with respect to claim 15, Fujita does not teach at least one or more object position measuring sensors each provided at a given position in a space, for detecting the position of said object in said space.

It is known by Yoshimura to teach of at least one or more object position measuring sensors (40, figs. 16-17) each provided at a given position in a space (figs. 16-17), for detecting the position of said object in said space (column 8, lines 28-37).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to combine the teachings of Fujita and Yoshimura for the purpose of detecting whenever an inspected object exist at a constant image pick-up position, it can be imaged and the image of the object can be obtained (column 8, lines 34-37).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 18, 22 and 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sakamoto et al. (US 2003/0174880).

With respect to claims 1 and 18, Sakamoto teaches of a three-dimensional measuring equipment (abstract, 303 of fig. 9), comprising of

a three-dimensional data acquisition device (201-204, fig. 10) for measuring the three-dimensional surface shape of an object (object 100, fig. 10) and a three-dimensional data processing device (205 and 400, fig. 10) for generating three-dimensional data based on the measuring result (par.0124),

said three-dimensional data acquisition device (201-204, fig. 10) comprising:

a plurality of light sources (201-201, fig. 10) each provided at a given position in a space (fig. 10), for projecting a stripe pattern onto said object (par.0052);

a plurality of measuring cameras (203-204, fig. 10) each provided at a given position in said space (fig. 10) for capturing the stripe pattern projected onto said object (par.0052, fig. 10) and for detecting a part or all of the position, inclination, direction of light axis, magnification of the camera within said space (par.0052, fig. 10),

said three-dimensional data processing device (205 and 400, fig. 10) comprising:

controller means (205) for directing (controls) said measuring cameras to obtain a part or all of parameters of the position, inclination, direction of light axis, magnification of said measuring cameras within said space (par.0054, fig. 10), for obtaining said parameters from said measuring cameras (shape images from cameras outputs to image memories 206-209, fig. 6; par.0054, lines 11), for extracting the combinations of said light source for projecting the stripe pattern to said object (par.0054-par.0057) and said measuring camera for capturing said stripe pattern based on said parameters (par.0053-0054), for performing control of measuring time of said measuring cameras for capturing (par.0056, lines 2-5), and for capturing the strip pattern of said object by means of said measuring cameras, to thereby obtain the measuring data (par.0053-0057);

three-dimensional data calculating means (304, fig. 9) for generating three-dimensional data based on said measuring data (par.0105-0106);

data processing means (237, fig. 9) for performing three-dimensional display of said object based on said three-dimensional data (par.0107); and

storage means (219-220, figs. 9-10) for storing said three-dimensional data generated (par.0104).

With respect to claims 1 and 18, Sakamoto does not teach that the controller means performing control of sequential order of said measuring cameras for capturing.

However, it is obvious that Sakamoto's camera controller (205) performs control of sequential order of said measuring cameras for capturing. Since Sakamoto explicitly teaches that the controller (205) controls the image capturing of the cameras (203-204, par.0054, lines 2-4) with camera control signals



Art Unit: 2863

(signals 3-4; par.0054, lines 2-4) and capture light pattern images at a plurality of times synchronizing to the phase shift of the light pattern (par.0056, lines 2-5).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to realize that Sakamoto's teaching of the camera controller is to capture images from the cameras(203-204) in sequential order for the purpose of synchronizing the images to the phase shift of the light pattern (par.0056, lines 2-5).

With respect to claim 22, Sakamoto teaches further a three-dimensional data processing device wherein the three-dimensional data calculating means performs the conversion of point-group data (par.0064-0067), rotation and translation after conversion (par.0083), synthesizing and smoothing (par.0083 and par.0066), based on said measuring data, for generating three-dimensional data (par.0064-0067 and 0083).

With respect to claim 26, Sakamoto teaches further a three-dimensional data processing device wherein the controller means performs the control of the measuring cameras based on the color information contained in the measuring data (par.0033 and 0119).

### ***Allowable Subject Matter***

Claims 2-11 and 19-21 and 22/19-21 through 26/19-21 would be allowable if rewritten or amended to overcome the claim objections.

The primary reason for the allowance of claim 2 is the combination of the limitations "at least one or more measuring camera position measuring sensors each provided at a given position in said space, for detecting a part or all of the parameters of the position, inclination, direction of light axis, magnification of said measuring camera in said space; and controller means for directing said measuring cameras to obtain a part or all of parameters of the position, inclination, direction of light axis, magnification of said measuring cameras within said space, and for performing control of sequential order and measuring time of said measuring cameras for capturing".

The primary reason for the allowance of claim 3 is the combination of the limitations “at least one or more object position measuring sensors each provided at a given position in a space for detecting the position of said object in said space; and controller means for directing said object position measuring sensor and said measuring cameras to obtain a part or all of the parameters of the position of said object in said space, the position, inclination, direction of light axis, magnification of said measuring camera in said space, for obtaining said parameters from said object position measuring sensors and said measuring cameras, for extracting the combination of the light source projecting the stripe pattern onto said object and said measuring camera capturing said stripe pattern based on said parameters, for performing the control of sequential order and measuring time of capturing said measuring cameras for capturing, and for capturing the stripe pattern of said object by means of said measuring cameras, to thereby obtain the measuring data”.

The primary reason for the allowance of claim 4 is the combination of the limitations “at least one or more measuring camera position measuring sensors each provided at a given position in said space, for detecting a part or all of the parameters of the position, inclination, direction of light axis, magnification of said measuring camera in said space; at least one or more measuring camera position measuring sensors each provided at a given position in said space, for detecting a part or all of the parameters of the position, inclination, direction of light axis, magnification of said measuring cameras in said space; and controller means for directing said object position measuring sensors and said measuring camera position measuring sensors to obtain a part or all of the parameters of the position of said object in said space, and the position, inclination, direction of light axis, magnification of said measuring cameras in said space, for obtaining said parameters from said object position measuring sensors and said measuring camera position measuring sensors, for extracting the combination of said light source projecting the stripe pattern onto said object and said measuring camera capturing said stripe pattern based on said parameters, for performing the control of sequential order and measuring time of capturing said measuring cameras for capturing, and for capturing the stripe pattern of said object by said measuring camera, to thereby obtain measuring data”.

The primary reason for the allowance of claim 19 is the combination of the limitations “controller means for directing measuring camera measuring position sensors for detecting a part or all of parameters of the position, inclination, direction of light axis, magnification, in a space of said three-dimensional data

Art Unit: 2863

acquisition device, of a plurality of measuring cameras each provided at a given position in said space of said three- dimensional data acquisition device for capturing the stripe pattern of said object projected thereon by a plurality of light sources each provided at a given position in said space of said three- dimensional data acquisition device for projecting the stripe pattern onto said object to obtain a part or all of the parameters of the position, inclination direction of light axis, magnification of said measuring cameras in said space, for obtaining said parameters from said measuring camera measuring position sensors, for extracting the combination of the light source projecting the stripe pattern onto said object and said measuring camera capturing said stripe pattern based on said parameters, for performing the control of sequential order and measuring time of said measuring cameras for capturing, and for capturing the stripe pattern of said object by means of said measuring cameras, to thereby obtain measuring data”.

The primary reason for the allowance of claim 20 is the combination of the limitations “controller means for directing at least one or more object position measuring sensors each provided at a given position in a space of said three-dimensional data acquisition device for detecting the position of said object and a plurality of measuring cameras each provided at a given position in said space of said three- dimensional data acquisition device for capturing the stripe pattern of said object projected by a plurality of light sources each provided at a given position in said space of said three- dimensional data acquisition device for projecting the stripe pattern onto said object and for detecting a part or all of the parameters of its position, inclination, direction of light axis, magnification in said space to obtain part or all of the parameters of the position of said object in said space, and the position, inclination, direction of light axis, magnification of said measuring cameras in said space, for obtaining said parameters from said object position measuring sensors and said measuring cameras, for extracting the combination of the light source projecting the stripe pattern onto said object and said measuring camera capturing said stripe pattern based on said parameters, for performing the control of sequential order and measuring time of said measuring cameras for capturing, and for capturing the stripe pattern of said object by means of said measuring cameras, to thereby obtain said measuring data”.

The primary reason for the allowance of claim 21 is the combination of the limitations “controller means for directing at least one or more object position measuring sensors each provided at a given position in a space of said three-dimensional data acquisition device for detecting the position of said object and a plurality of measuring camera measuring position sensors each provided at a given position in said

Art Unit: 2863

space of said three-dimensional data acquisition device for detecting a part or all of the parameters of the position, inclination, direction of light axis, magnification, in said space of said three-dimensional data acquisition device, of a plurality of measuring cameras each provided at a given position in said space of said three-dimensional data acquisition device for capturing the stripe pattern of said object projected by a plurality of light sources each provided at a given position in said space of said three-dimensional data acquisition device for projecting the stripe pattern onto said object to obtain a part or all of the parameters of the position of said object in said space and the position, inclination, direction of light axis, magnification of said measuring cameras in said space, for obtaining said parameters from said object position measuring sensors and said measuring camera measuring position sensors, for extracting the combination of the light source projecting the stripe pattern onto said object and said measuring camera capturing said stripe pattern based on said parameters, for performing the control of the sequential order and measuring time of said measuring cameras for capturing, and for capturing the stripe pattern of said object by means of said measuring cameras to obtain measuring data”.

The prior art of record, taken alone or in combination, fails to disclose or render obvious.

Claims 5-11 would be allowable due to their dependency on claims 3 or 4.

Claims 22-26 would be allowable due to their dependency on claims 19, 20, or 21.

Claims 16-17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 23-25 are objected to as being dependent upon a rejected base claim 18, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art of record, taken alone or in combination, fails to disclose or render obvious, which makes the following claims allowable over the prior art:

With respect to claim 16, a three-dimensional data acquisition device wherein the measuring camera moves under the control of the controller means based on the position of the object detected by the object position measuring sensor, to thereby capture the stripe pattern.

With respect to claim 17, a three-dimensional data acquisition device wherein the measuring camera alters its inclination, direction of light axis, and magnification under the control of the controller means based on the position of the object detected by said object position measuring sensor, to thereby capture the stripe pattern.

With respect to claim 23, a three-dimensional data processing device wherein when the controller means extracts the combination of said light source and said measuring camera, it extracts a combination such that the stripe patterns projected by the light source do not overlap with each other on the object.

With respect to claim 24, a three-dimensional data processing device wherein when extracting the combination of the light source and the measuring camera, if said measuring camera has a lens or filter that blocks the light of a specific frequency or a color filter that blocks a specific color, the controller means extracts appropriately a combination of said light source and said measuring camera.

With respect to claim 25, a three-dimensional data processing device wherein the measuring camera has a lens or filter that extracts a specific phase, the controller means controls, in a time-division manner, switching on and off the function of said lens or filter that extracts a specific phase.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Fax/Telephone Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cindy D. Khuu whose telephone number is (571) 272-8585. The examiner can normally be reached on M-F, 7:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on (571) 272-2312. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Cindy HienDieu Khuu/  
12/17/2009